



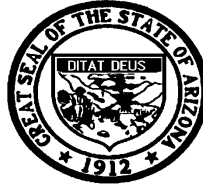
# **OBESITY IN ARIZONA:**

## **PREVALENCE, HOSPITAL CARE UTILIZATION, MORTALITY**

**Public Health Services**  
Bureau of Public Health Statistics



~ Leadership for a Healthy Arizona ~



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# **OBESITY IN ARIZONA: PREVALENCE, HOSPITAL CARE UTILIZATION, MORTALITY**

## **ACKNOWLEDGEMENTS:**

This report was produced with the support and input from the following individuals within the Arizona Department of Health Services: Dr. Christopher Mrela, Brian Bender, Richard Porter, Christine Pierce and Ross Merritt. Other individuals within the Office of Chronic Disease Prevention and Nutrition Services contributed to the effort that went into this report. We thank all who were involved in the project.

**SEPTEMBER 2006**



# **OBESITY IN ARIZONA: PREVALENCE, HOSPITAL CARE UTILIZATION, MORTALITY**

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### **Purpose**

The purpose of this report is to provide information concerning the prevalence of obesity and associated statistics from the Behavioral Risk Factor Surveillance System (BRFSS), vital records and the hospital discharge database.

Nationally, on average, men and women have gained more than 24 pounds between the early 1960s and 2002. During the same time period, mean height increased about 1 inch. In 1999–2002 mean weight of men 20 years and over was almost 190 pounds while among women the mean weight was around 163 pounds. Mean height for men in 1999–2002 was about 69 inches and for women was about 64 inches.<sup>1</sup>

### **Methods and Sources**

Four data sources were utilized in producing this report: Arizona Behavioral Risk Factor Surveillance System (BRFSS) telephone survey, the hospital discharge database and the birth and mortality databases.

The BRFSS is a random sample telephone survey, using disproportionate stratified sampling, random digit dialing, and a Computer Assisted Telephone Interviewing (CATI) system. A sample size of 4,700 interviews over a 12-month period was selected to achieve an acceptable confidence interval on risk factor prevalence estimates of the Arizona adult population.

The collected data is compiled and weighted by the Centers for Disease Control and Prevention (CDC). Weighted counts were based on the Arizona population to accurately reflect the population demographics. The weighting factor considered the number of adults and telephone lines in the household, cluster size, stratum size, and age/race/sex distribution of the general population.

All analyses presented are based on cell counts of at least eight cases. The demographic information that was collected and presented in these results includes sex, age, education, household income, race, and ethnicity.

The hospital discharge database contains two types of records: inpatient hospitalizations and emergency room visits. An inpatient discharge occurs when a person who was admitted to a hospital leaves that hospital. A person who has been hospitalized more than once in a given calendar year will be counted multiple times as a discharge and included more than once in the hospital inpatient discharge data set; thus, the numbers we report here are for discharges, not persons.

Up to nine diagnoses are coded for each discharge. Diagnostic groupings and code numbers are based on the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM).

The emergency department (ED) and the inpatient hospitalization data are mutually exclusive. The ED data include only those who were not admitted as inpatients. All inpatient discharges and emergency department visits are those of the residents of Arizona.

Information on births and deaths is compiled from the original documents filed with the Arizona Department of Health Services', Office of Vital Records and from transcripts of original death certificates filed in other states but affecting Arizona residents.

For the purpose of mortality statistics, every death is attributed to one underlying condition or underlying cause of death. The underlying cause is defined as the disease or injury that initiated the chain of events leading directly to death. It is selected from up to 20 causes and conditions entered by the physician on the death certificate. The totality of all these conditions is known as multiple cause of death. The causes of death for 2000–2005 are classified by ICD-10, replacing the Ninth Revision used during 1979–1999. The multiple cause-of-death data for Arizona are not available prior to 2000.

## **Executive Summary**

### **Arizona Behavioral Risk Factor Survey**

- Over the last 15 years the estimated prevalence of obesity in Arizona's adult population has doubled to 21%.
- In the last four years obesity has trended downward for males and upward for females.
- The highest prevalence of obesity is in middle years, 34 – 64 years of age.
- Education does not appear to be much of an indicator of obesity.
- The highest reported prevalence of obesity in Arizona is in those whose income is between \$15,000 and \$25,000 a year.
- Non-white races report a higher prevalence of obesity than the white race (24.2% vs 19.6%).

### **Arizona Hospital Inpatients**

- In 2005 there were 1760 inpatients with morbid obesity as the first listed diagnosis. Almost all of these were admitted for bariatric surgery.
- There were 11,267 patients in 2005 who had morbid obesity listed as one of the diagnoses. This is a 154% increase from the year 2000.
- Sixty-six percent of the bariatric surgeries in 2005 were paid for with private insurance.

- The gross charges for these surgeries in 2005 totaled \$65.8 million.
- The gross charges for all inpatients with a mention of morbid obesity in 2005 exceeded \$320 million.

### **Emergency Department Visits**

- In 2005, there were 1668 visits to emergency departments in Arizona with a listed diagnosis of morbid obesity.
- Females made 2.2 times as many visits with a diagnosis of morbid obesity as males.
- AHCCCS was the primary payer for visits with morbid obesity as the diagnosis, 38.5% of the visits.
- The total gross charges for emergency department visits in Arizona with a listed diagnosis of morbid obesity exceeded \$3 million in 2005.

### **Mortality**

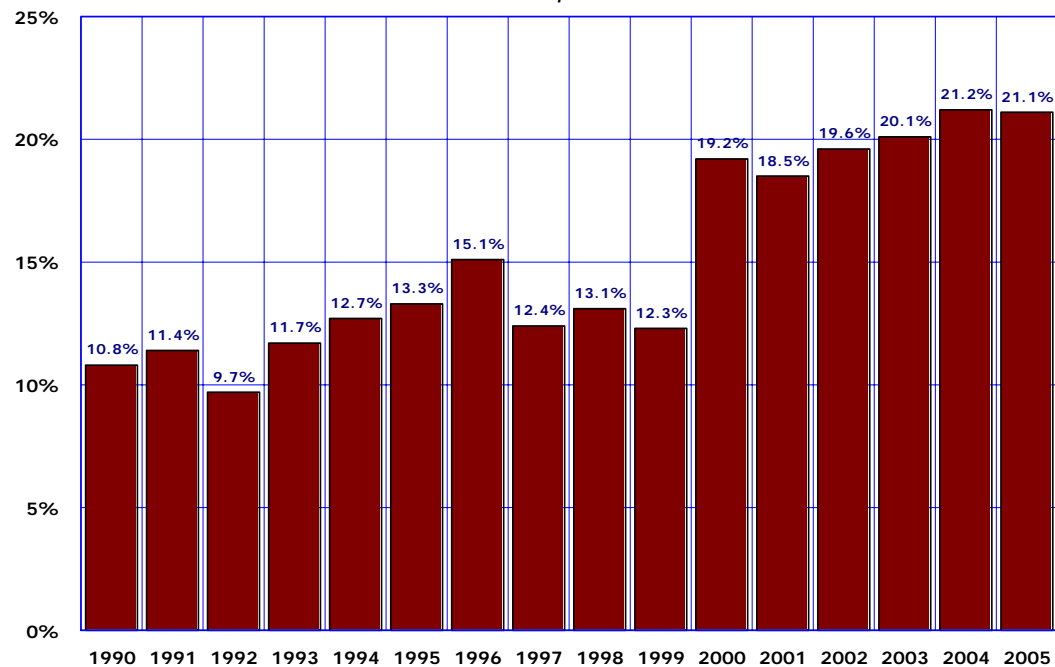
- There were 81 deaths in 2005 with the underlying cause of death of morbid obesity. This is compared to 14 for 1990.
- There were 262 deaths in 2005 with morbid obesity mentioned in the cause of death area. There were less than 100 in 2000.

Arizona BRFSS respondents are asked to provide their height and weight. This information is used to calculate body mass index (BMI). BMI is calculated using the following formula: weight in kilograms divided by height in meters squared ( $\text{Kg}/\text{M}^2$ ) or  $(\text{pounds} * 0.454) \div (\text{inches} * 0.0254)^2$ . A BMI of 30.0 or more is considered obese. In the BRFSS, the BMI computation formula is applied to self-reported data rather than actual physical measurements such as used in the National Health and Nutrition Examination Survey (NHANES).

The estimated prevalence of obesity in Arizona (based on BMI computed from self-reported weight and height) doubled from 10.8 percent in 1990 to 21.1 percent in 2005 (**Figure 1**).

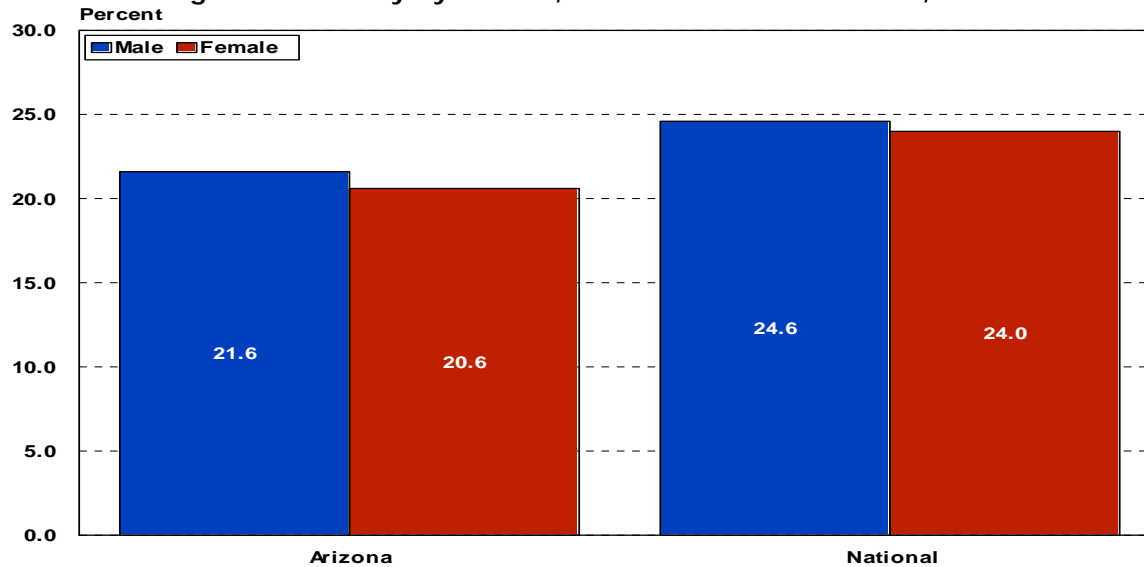
The target for Healthy People 2010 is to reduce the incidence of obesity of persons 20 years and older to less than 15 percent.<sup>6</sup>

**Figure 1 - Arizonans 18 Years Old or Older Whose Body Mass Index (BMI) is 30.0 or More, 1990-2005**





**Figure 2 - Obesity By Gender, Arizona and United States, 2005**



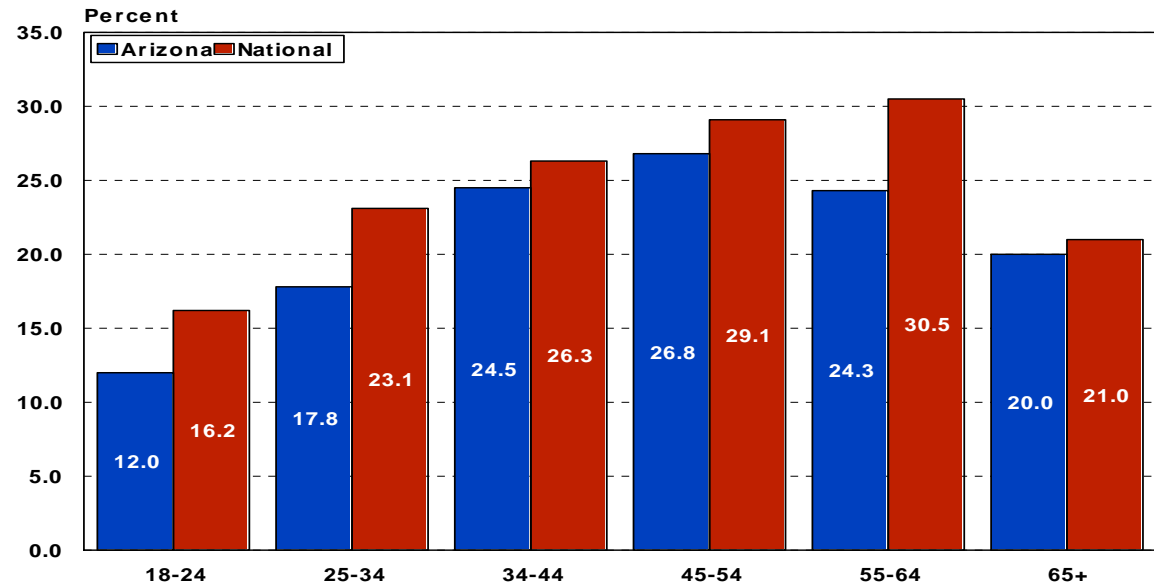
Males (21.6 percent) report a higher estimated prevalence of obesity than females (20.6 percent) (Figure 2). Nationally, in 2005, the median percentages for males and females were 24.6 percent and 24.0 percent respectively.

Males who are 45-54 years of age (25.7 percent), White (21.8 percent) and Non-Hispanic (22.6 percent) were the most likely to be obese. Females who are 45-54 years of age (27.9 percent), Non-White (28.2 percent) and Hispanic (28.3 percent) were the most likely to be obese.

Obesity in males over the last four years show a downward trend. Females show an upward trend during the same time period.

Arizona Obesity Prevalence By Gender 2002-2005				
	2002	2003	2004	2005
Male	23.0	22.1	22.2	21.6
Female	16.3	18.1	20.1	20.6

Figure 3 - Obesity By Age, Arizona and United States, 2005

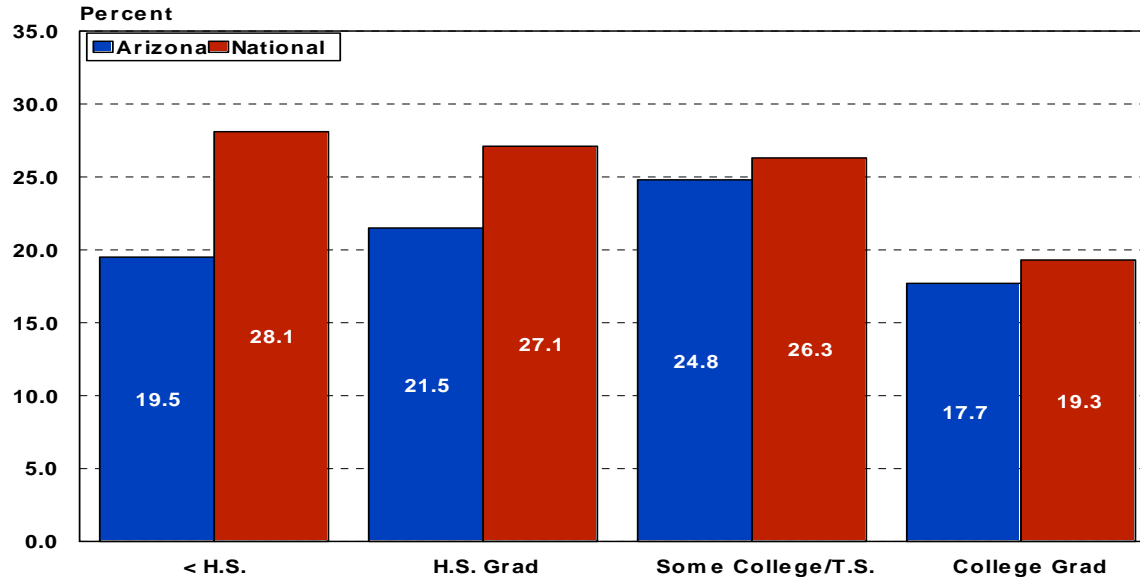


Those least likely to be obese are persons 18-24 years of age. In Arizona, respondents who are 45-54 years of age were more likely to be obese than any other age group (**Figure 3**). All age specific percentages were higher nationally than in Arizona. Nationally, those respondents 55-64 years of age were most likely to be obese.

Between 2002 and 2005, changes in the age-specific prevalence of obesity in Arizona were far from consistent. There is no evidence of an increasing trend or a declining trend equally experienced by all age groups.

Arizona Obesity Prevalence By Age 2002-2005				
	2002	2003	2004	2005
18-24	9.5	12.2	15.8	12.0
25-34	19.2	21.6	22.0	17.8
35-44	22.7	20.6	21.8	24.5
45-54	23.2	23.6	25.5	26.8
55-64	28.2	22.7	23.7	24.3
65+	14.7	18.6	17.8	20.0

Figure 4 - Obesity By Education, Arizona and United States, 2005

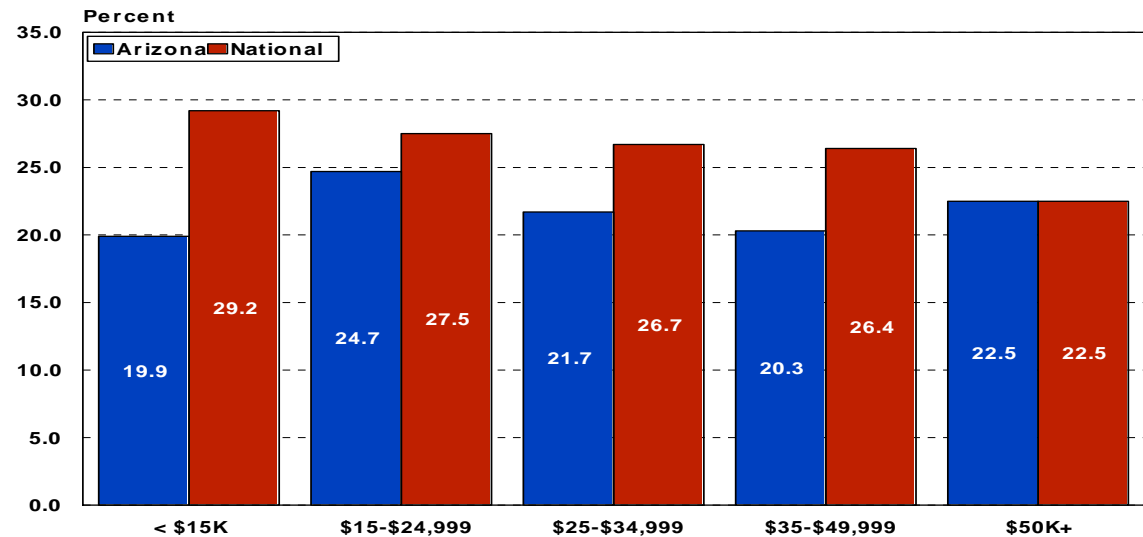


Arizonans with some college or technical school showed the highest estimated prevalence of obesity (24.8 percent), followed by those with mid-level education (21.5 percent, **Figure 4**). Those with a college education had the lowest prevalence estimate (17.7 percent). Nationally, obesity was inversely related to education and the percentages of obesity were higher for each education level than in Arizona.

There does not appear to be any consistent trends in obesity prevalence by education.

Arizona Obesity Prevalence By Education 2002-2005				
	2002	2003	2004	2005
< H.S.	21.8	29.0	21.2	19.5
High School	20.2	23.7	23.5	21.5
Some College/Tech School	19.5	19.0	24.0	24.8
College Grad	18.7	15.8	16.7	17.7

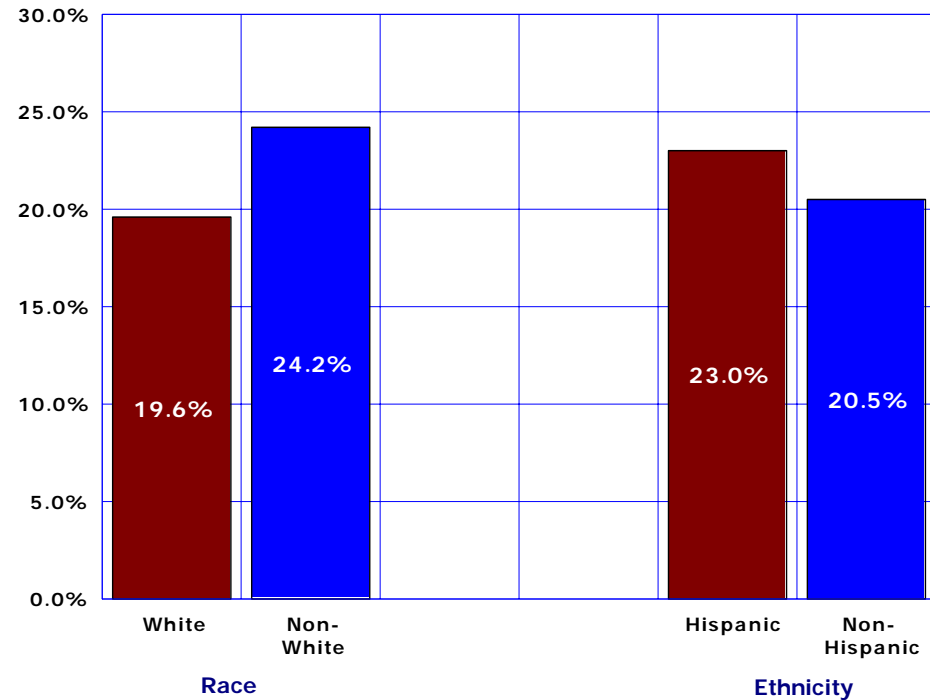
Figure 5 - Obesity By Income, Arizona and United States, 2005



Arizona respondents with incomes between \$15,000 and \$24,999 reported the highest prevalence of obesity (24.7 percent), followed by those earning \$50,000 or more (22.5 percent, **Figure 5**). The lowest prevalence was among those with incomes of less than \$15,000 (19.9 percent). Nationally, obesity rates in every income level were greater than in Arizona except those earning \$50,000 or more where the rates were the same.

Arizona Obesity Prevalence By Income 2002-2005				
	2002	2003	2004	2005
<\$15K	21.7	26.0	19.4	19.9
\$15K-<\$25K	24.3	22.4	21.8	24.7
\$25K-<\$35K	22.8	17.6	21.7	21.7
\$35K-<\$50K	17.8	19.8	26.5	20.3
\$50K+	19.8	19.9	18.4	22.5

Figure 6 - Obesity By Race and Ethnicity, 2005

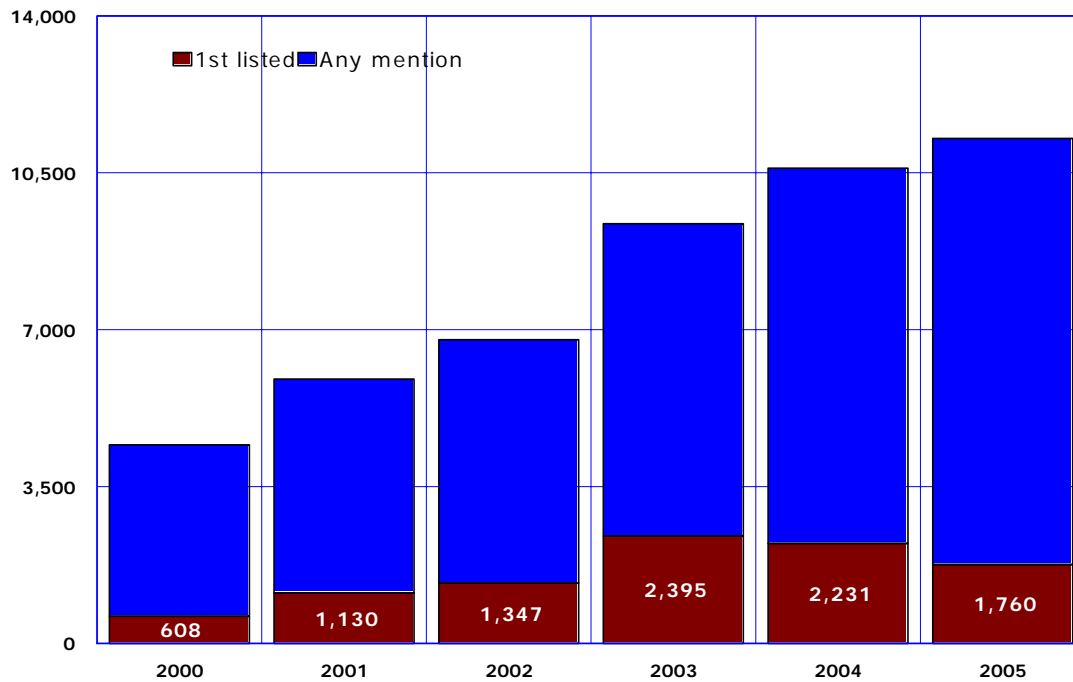


In 2005, non-Whites reported a higher prevalence of obesity (24.2 percent) than Whites (19.6 percent). Hispanics (23.0 percent) were higher than non-Hispanics (20.5 percent, **Figure 6**).

White race and non-Hispanic ethnicity both show a very slight inclination toward an increasing trend in obesity.

Arizona Obesity Prevalence By Race and Ethnicity, 2002-2005				
	2002	2003	2004	2005
<b>Race</b>				
White	18.7	18.6	18.9	19.6
Non-White	22.1	24.2	26.4	24.2
<b>Ethnicity</b>				
Hispanic	19.5	24.4	26.7	23.0
Non-Hispanic	19.5	19.2	19.7	20.5

**Figure 7 - Inpatient Discharges with Morbid Obesity as First-Listed Diagnosis and Any Mention of Morbid Obesity on the Medical Record, Arizona Residents, 2000-2005**



In 2005, **morbid obesity** (ICD-9-CM code 278.01) was the first-listed diagnosis (the first one listed on the discharge summary of the medical record) for 1,760 inpatient hospitalizations (**Figure 7**), almost three times the number reported for 2000. After reaching the recent peak in 2003, the number of inpatient hospitalizations for morbid obesity as first-listed diagnosis declined for the second consecutive year.

However, when we count all entries of the diagnostic code for morbid obesity within the nine diagnostic fields, there has been a continuous increase in the number of hospitalizations related to morbid obesity: from 4,431 in 2000 to 11,267 in 2005 (**Figure 7**).

Females accounted for 1,417 (80.5 percent) of the 1,760 inpatient hospitalizations for morbid obesity as first-listed diagnosis (**Table 1**). In 2005, the majority of inpatient hospitalizations were young-adults 20-44 years (50.7 percent), followed by middle-aged adults 45-64 years old (46.0 percent). Children or adolescents younger than 20 years of age accounted for 0.6 percent (11 cases) of all inpatient hospitalizations for first-listed morbid obesity. In addition, there were 47 inpatient hospitalizations among elderly Arizonans 65 years old or older in 2005.

Bariatrics is a branch of medicine that deals with the surgical treatment of obesity. Bariatric (or obesity) surgery has seen a rather dramatic increase in its popularity. Not a single *laparoscopic gastroenterostomy* was performed in Arizona prior to 2004. In 2004, there were 320 procedures performed, followed by 1,130 in 2005 (**Table 2**).

A typical candidate for gastrointestinal surgery has a body mass index (BMI) of 40 or more – about 100 pounds overweight for men and 80 pounds for women. Bariatric surgery may also be considered for someone whose BMI is between 35 and 39.9 and who has a serious obesity-related health problem (such as type 2 diabetes, heart disease or severe sleep apnea).

The number of inpatient hospitalizations for morbid obesity as first-listed diagnosis (**Table 2**) increased from 608 in 2000 to a recent peak of 2,395 in 2003. There was a decrease in the number of inpatient hospitalizations for morbid obesity both in 2004 (2,231) and 2005 (1,760).

In 2005, *laparoscopic gastroenterostomy* accounted for 64.2 percent of all bariatric surgeries performed in Arizona (**Figure 8**). The surgeon makes one or more small incisions through which surgical instruments are passed, eliminating the need for a large incision.

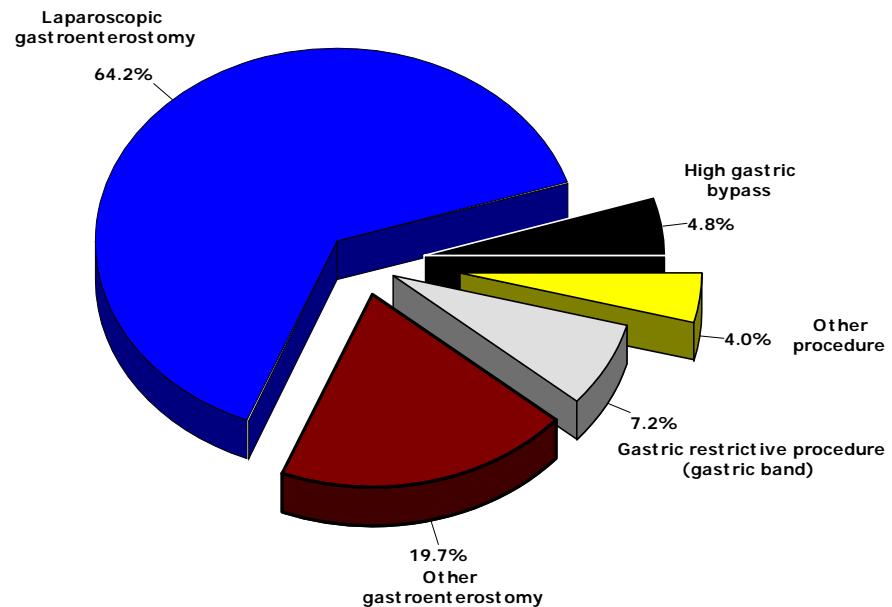
*Gastric restrictive procedure* accounted for 7.2 percent of obesity surgeries in 2005. In this procedure, a hollow band made of silicone rubber is placed around the stomach near its upper end. The band is then inflated with a salt solution. It can be tightened or loosened to change the size of the passage into the rest of the stomach.

The number of *gastric bypass* surgeries, once the most common bariatric procedure, declined from a recent high of 2,123 in 2003 to 672 in 2004 and only 85 (4.8 percent) in 2005. In this procedure, the surgeon creates a small stomach pouch to restrict food intake. Next, a Y-shaped section of the small intestine is attached the pouch to allow food to bypass the lower stomach.

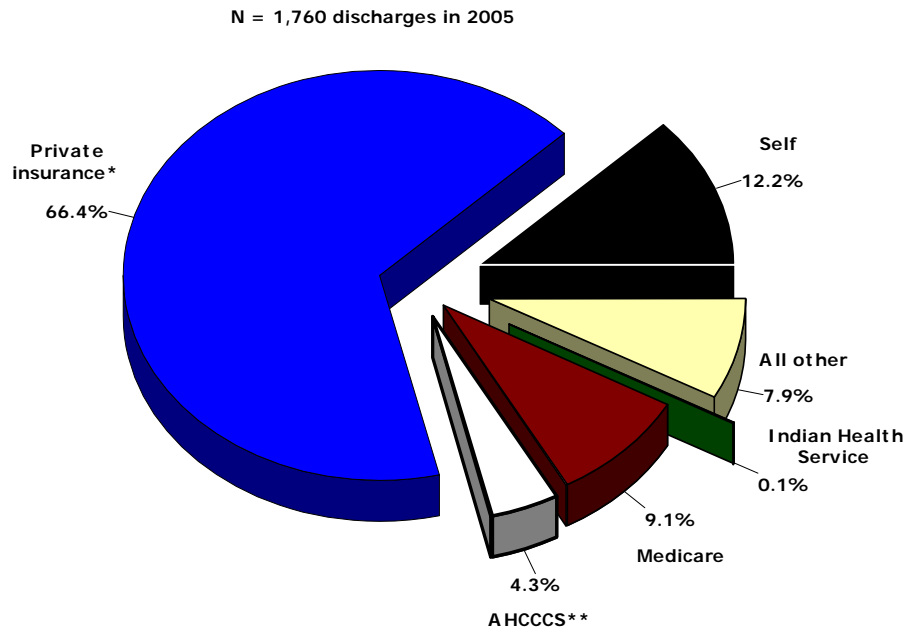
In 2005, other gastrointestinal procedures accounted for one in five of all bariatric surgeries performed in Arizona hospitals. Three of the 1,760 patients died in 2005 following a gastrointestinal surgery.

**Figure 8 - Types of Surgical Procedures Performed in Treatment of Morbid Obesity, Arizona Residents, 2005**

N = 1,760 (ICD-9-CM code 278.01 for morbid obesity used as first-listed diagnosis)



**Figure 9 - Hospital Inpatient Discharges with Morbid Obesity (ICD-9-CM 278.01) as First-Listed Diagnosis by Payer, Arizona Residents, 2005**



\*Indemnity, HMO, PPO.

\*\*The Arizona Health Care Cost Containment System is the State's Medicaid Program.

Private insurance (traditional indemnity, HMO or PPO) was recorded for 66.4 percent of inpatient discharges with morbid obesity as first-listed diagnosis. Self-pay (12.2 percent) was the second expected source of payment for the charges associated with hospital stay. It was followed by Medicare (9.1 percent) and the Arizona Health Care Cost Containment System (AHCCCS), the State's Medicaid program (4.3 percent).

The total gross charges incurred in 2005 by the 1,760 inpatient hospitalizations for **morbid obesity as first-listed diagnosis** exceeded 65 million dollars (\$65,863,177 or \$37,422.3 per discharge).

In 2005, the highest per capita charges were those for Medicare discharges (\$44,666.6), followed by AHCCCS (\$43,010.7). Per capita hospital charges for inpatients who had private insurance coverage were below the average at \$36,748.6, and so were the per capita charges for self-paying inpatients (\$33,385.1).

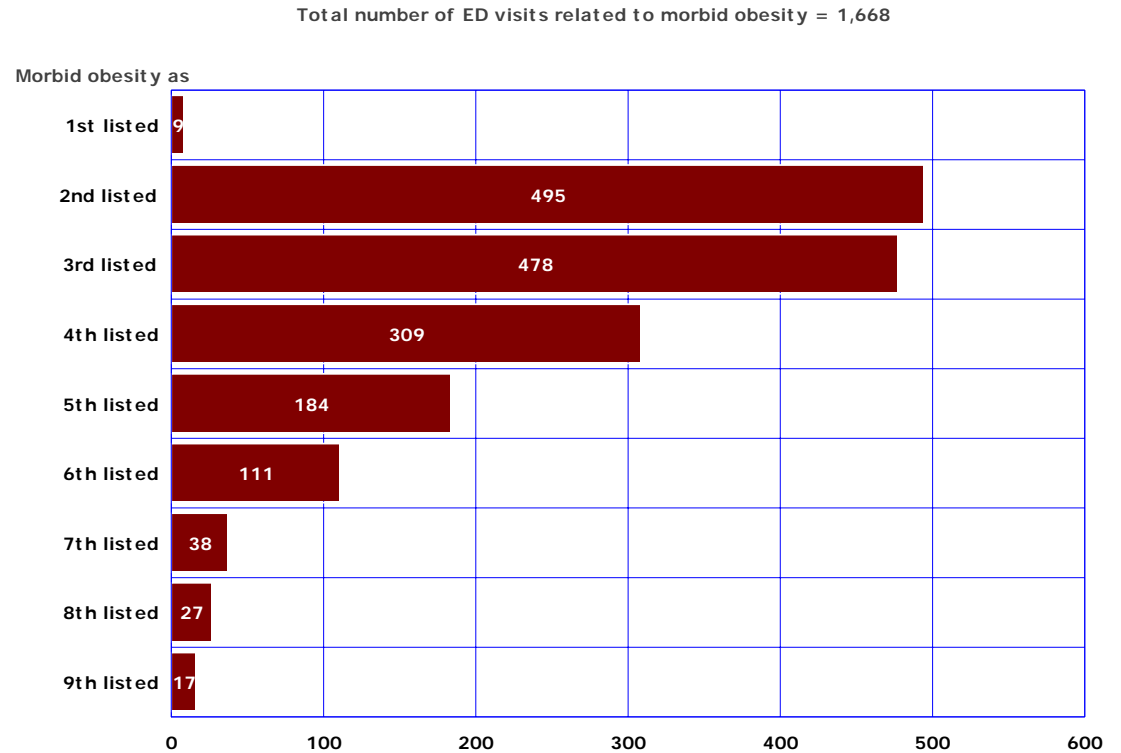
The total gross charges incurred in 2005 by the 11,267 inpatient discharges from Arizona short-stay hospitals with **any mention of morbid obesity** (including the 1,760 first listed diagnoses) exceeded 320 million dollars (\$320,507,503). It is important to note, that the above amounts do not tell us anything about the actual payments received by hospitals.



**Figure 10 - Number of Emergency Department Visits Related to Morbid Obesity, Arizona Residents, 2005**

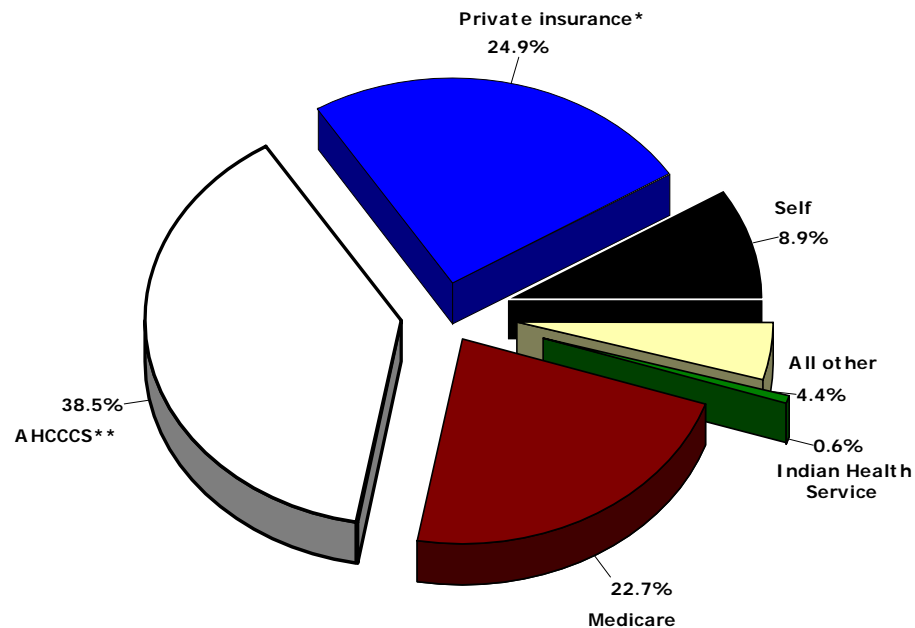
During 2005, 1,668 visits made by Arizona residents to hospital emergency departments were related to morbid obesity. Only in nine cases morbid obesity was recorded as a first-listed diagnosis. Morbid obesity diagnosis was substantially more frequently present as 2nd-6th listed on the medical record than it was first-listed (**Figure 10**). For 1,659 cases where morbid obesity was not reported as first-listed diagnosis, the chief complaints or reasons for a visit to the emergency room were injuries (290), back pain and other spinal/musculoskeletal disorders (216), sprains and strains (135), chest pain (119), cellulites and abscess (67). These five leading patient complaints accounted for 50 percent of all visits.

Females made 2.2 times as many emergency department visits related to morbid obesity than males (1,146 vs. 522). The majority of morbid obesity-related emergency room visits were made by young adults 20-44 years old (923, or 55.3 percent of all visits) followed by middle-aged adults (542, 32.5 percent) and elderly 65 years or older (97 or 5.7 percent). There were 69 emergency room visits related to morbid obesity made by adolescents 15-19 years old, and 37 visits made by children 1-14 years of age.



**Figure 11 - Emergency Department Visits Related to Morbid Obesity (ICD-9-CM 278.01) by Payer, Arizona Residents, 2005**

N = 1,668 ED visits in 2005



The Arizona Health Care Cost Containment System (AHCCCS) was payer for 38.5 percent of emergency room visits related to morbid obesity. Private insurance was the second expected source of payment (24.9 percent). It was followed by Medicare (22.7 percent) and self-pay (8.9 percent; **Figure 11**).

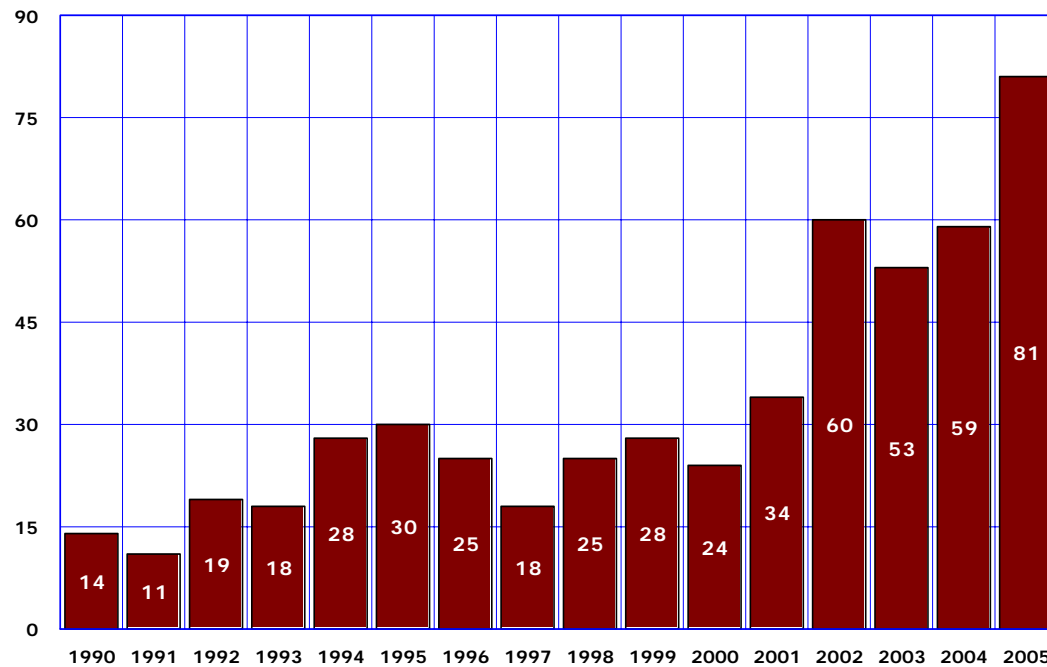
The total gross charges incurred in 2005 by the 1,668 patients seen in the emergency departments in relation to **morbid obesity** exceeded 3 million dollars (\$3,278,623 or \$1,965.6 per visit).

The total gross charges incurred in 2005 by the 11,267 inpatient discharges from Arizona short-stay hospitals and 1,668 ED patients for **any mention of morbid obesity** (including the 1,769 first listed diagnoses) was \$323,786,126. Again, this combined amount was charged by but not necessarily received by hospitals.

\*Indemnity, HMO, PPO.

\*\*The Arizona Health Care Cost Containment System is the State's Medicaid Program.

**Figure 12 - Morbid Obesity as the Underlying Cause of Death,  
Arizona Residents, 1990-2005**



Note: The causes of death for 1990-1999 are classified by the Ninth Revision of the International Diseases (ICD-9). The ICD-9 code 278.0 identifies morbid obesity as the underlying cause of death for 2000-2005 are classified by the Tenth Revision (ICD-10). The ICD-10 codes E66.8 (morbid obesity) and E66.9 (obesity, unspecified) are used to identify the deaths from obesity in 2000-2005.

For the purpose of mortality statistics, every death is attributed to one underlying condition or underlying cause of death. The underlying cause is defined as the disease or injury that initiated the chain of events leading directly to death.

In 2005, 81 deaths of Arizona residents had morbid obesity assigned as the underlying cause (**Table 4**). One out of two Arizonans who died from morbid obesity was younger than 54 years old. Compared to the median age at death from all causes among Arizonans in 2005 (77 years) those who died from morbid obesity were 23.3 years younger.

Among the 81 deaths, there were 46 males and 35 females. Morbid obesity accounted for 60 deaths among White non-Hispanics, eight deaths among Hispanics or Latinos, seven deaths among American Indian residents of Arizona, five deaths among Blacks or African Americans, and a single death among Asians or Pacific Islanders.

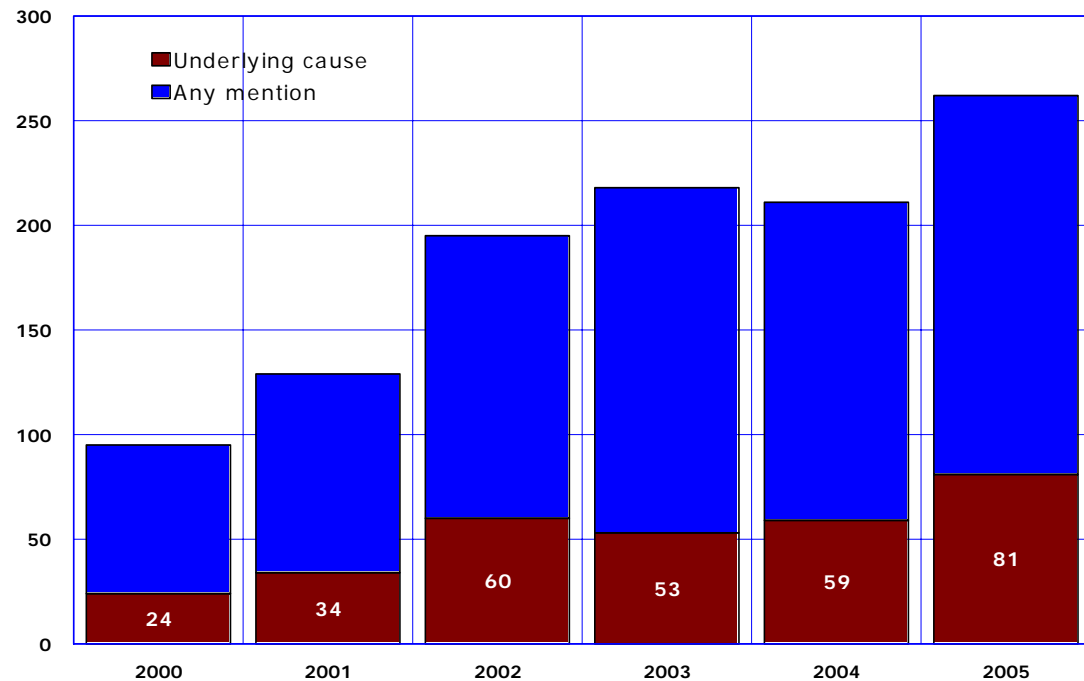
With the exception of two of the deceased who never worked in their lives, others have represented all walks of life: a homemaker, a manager, a truck driver, a laborer, a psychologist, a mechanic, a cook, a librarian, major and a prison guard (**Table 5**).

The underlying cause of deaths is selected from up to 20 causes and conditions entered by the physician on the death certificate. The totality of all these conditions is known as multiple cause of death.

In addition to 81 deaths in 2005 that had morbid obesity assigned as the underlying cause, another 181 deaths had morbid obesity assigned as the other than underlying cause. The sum of these two counts (262, **Figure 13, Table 4**) is the total number of deaths that had any mention of morbid obesity on the 2005 death certificates, 2.8 times as many as in 2000.

Diseases of the circulatory system were recorded as the underlying cause of death in 99 (54.7 percent) of the 181 cases in which morbid obesity was a contributing factor. Diabetes mellitus was the second most frequently recorded as the underlying cause (19 cases or 10.5 percent).

**Figure 13 - Morbid Obesity as the Underlying Cause of Death and Any Mention of Obesity on Death Certificates, Arizona Residents, 2000-2005**



**TABLE 1**  
**EMERGENCY DEPARTMENT VISITS AND INPATIENT HOSPITALIZATIONS FOR MORBID OBESITY (ICD-9-CM CODE 278.01)**  
**BY GENDER, AGE GROUP AND COUNTY OF RESIDENCE AMONG ARIZONA RESIDENTS, 2005**

			Total		Inpatient discharge		Emergency room visit	
			Morbid obesity, all mentions*	1st listed diagnosis	Morbid obesity, all mentions*	1st listed diagnosis	Morbid obesity, all mentions*	1st listed diagnosis
Gender	Total		12,935	1,769	11,267	1,760	1,668	9
	Female		8,780	1,423	7,634	1,417	1,146	6
	Male		4,155	346	3,633	343	522	3
Age group	<15	Total	83	1	46	0	37	1
		Female	41	1	24	0	17	1
		Male	42	0	22	0	20	0
	15-19	Total	204	12	135	11	69	1
		Female	133	7	84	6	49	1
		Male	71	5	51	5	20	0
	20-44	Total	4,876	897	3,953	892	923	5
		Female	3,415	721	2,782	718	633	3
		Male	1,461	176	1,171	174	290	2
	45-64	Total	5,708	812	5,166	810	542	2
		Female	3,799	656	3,429	655	370	1
		Male	1,909	156	1,737	155	172	1
	65+	Total	2,064	47	1,967	47	97	0
		Female	1,392	38	1,315	38	77	0
		Male	672	9	652	9	20	0
County of residence	Apache	Total	53	3	44	3	9	0
		Female	34	1	29	1	5	0
		Male	19	2	15	2	4	0
	Cochise	Total	304	43	266	42	38	1
		Female	217	37	190	37	27	0
		Male	87	6	76	5	11	1
	Coconino	Total	179	27	154	27	25	0
		Female	127	19	110	19	17	0
		Male	52	8	44	8	8	0
	Gila	Total	131	10	115	10	16	0
		Female	78	8	68	8	10	0
		Male	53	2	47	2	6	0
	Graham	Total	88	13	79	13	9	0
		Female	67	10	60	10	7	0
		Male	21	3	19	3	2	0
	Greenlee	Total	24	9	24	9	0	0
		Female	14	6	14	6	0	0
		Male	10	3	10	3	0	0

OBESITY IN ARIZONA: PREVALENCE, HOSPITAL CARE UTILIZATION, MORTALITY

**TABLE 1**  
**EMERGENCY DEPARTMENT VISITS AND INPATIENT HOSPITALIZATIONS FOR MORBID OBESITY (ICD-9-CM CODE 278.01)**  
**BY GENDER, AGE GROUP AND COUNTY OF RESIDENCE AMONG ARIZONA RESIDENTS, 2005** (continued)

			Total		Inpatient discharge		Emergency room visit	
			Morbid obesity, all mentions*	1st listed diagnosis	Morbid obesity, all mentions*	1st listed diagnosis	Morbid obesity, all mentions*	1st listed diagnosis
County of residence	La Paz	Total	44	5	41	5	3	0
		Female	30	4	29	4	1	0
		Male	14	1	12	1	2	0
	Maricopa	Total	7,039	1,193	6,404	1,190	635	3
		Female	4,829	954	4,396	952	433	2
		Male	2,210	239	2,008	238	202	1
	Mohave	Total	354	43	347	43	7	0
		Female	212	31	206	31	6	0
		Male	142	12	141	12	1	0
	Navajo	Total	163	25	141	24	22	1
		Female	109	23	100	22	9	1
		Male	54	2	41	2	13	0
	Pima	Total	2,781	248	2,163	245	618	3
		Female	1,927	196	1,480	194	447	2
		Male	854	52	683	51	171	1
	Pinal	Total	772	72	703	72	69	0
		Female	478	64	436	64	42	0
		Male	294	8	267	8	27	0
	Santa Cruz	Total	52	6	47	6	5	0
		Female	32	6	30	6	2	0
		Male	20	0	17	0	3	0
	Yavapai	Total	483	45	346	44	137	1
		Female	317	39	223	38	94	1
		Male	166	6	123	6	43	0
	Yuma	Total	371	8	300	8	71	0
		Female	238	7	192	7	46	0
		Male	133	1	108	1	25	0
	Unknown	Total	97	19	93	19	4	0
		Female	71	18	71	18	0	0
		Male	26	1	22	1	4	0

\*Refers to all entries of ICD-9-CM code 278.01 made within the nine diagnostic fields.

# OBESITY IN ARIZONA: PREVALENCE, HOSPITAL CARE UTILIZATION, MORTALITY

**TABLE 2**  
**CHARACTERISTICS OF INPATIENT DISCHARGES WITH MORBID OBESITY (ICD-9-CM 278.01), ARIZONA RESIDENTS, 2000-2005**

	2000	2001	2002	2003	2004	2005
Any mention of morbid obesity in one or more of the diagnostic fields on the medical record	4,431	5,900	6,778	9,362	10,603	11,267
Morbid obesity as first-listed diagnosis	608	1,130	1,347	2,395	2,231	1,760
<b>Gender:</b>						
Female	494	911	1,118	1,987	1,826	1,417
Male	114	208	229	408	405	343
<b>Age group:</b>						
19 years old or younger	8	14	10	9	17	11
20-44 years old	371	691	774	1,277	1,157	892
45-64 years old	222	416	545	1,065	1,108	810
65 years old or older	7	9	18	44	39	47
<b>Type of obesity surgery performed:</b>						
High gastric bypass <sup>1</sup>	567	1,011	1,182	2,123	672	85
Laparoscopic gastroenterostomy <sup>2</sup>	0	0	0	0	320	1,130
Other gastroenterostomy <sup>3</sup>	29	80	76	170	1,092	347
Gastric restrictive procedure (gastric band) <sup>4</sup>	0	0	0	0	31	127

Note: Based on hospital inpatient discharges from short-stay, non-federal hospitals in Arizona.

<sup>1</sup>First-listed ICD-9-CM procedure code 44.31.

<sup>2</sup>First-listed ICD-9-CM procedure code 44.38.

<sup>3</sup>First listed ICD-9-CM procedure code 44.39.

<sup>4</sup>First-listed ICD-9-CM procedure code 44.95.

OBESITY IN ARIZONA: PREVALENCE, HOSPITAL CARE UTILIZATION, MORTALITY

**TABLE 3**  
**MORBID OBESITY (ICD-9 CODE 278.0) AS THE UNDERLYING CAUSE OF DEATH,**  
**ARIZONA RESIDENTS, 2000-2005**

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Obesity as the underlying cause of death:	14	11	19	18	28	30	25	18	25	28
<b>Gender:</b>										
Male	7	7	9	8	15	16	10	9	14	17
Female	7	4	10	10	13	14	15	9	11	11
<b>Age group:</b>										
Children 1-14 years old	0	0	0	0	0	0	0	0	0	0
Adolescents 15-19 years old	0	0	0	0	0	0	0	0	0	1
Young adults 20-44 years old	6	4	8	7	10	7	8	3	13	15
Middle-aged adults 45-64 years old	6	5	5	6	15	15	15	12	8	8
Elderly 65 years old or older	2	2	6	5	3	8	2	3	4	4
<b>Race/ethnicity:</b>										
White non-Hispanic	12	9	12	15	21	24	16	16	18	19
Hispanic or Latino	1	1	5	1	5	5	2	1	5	4
Black or African American	0	1	1	1	2	0	4	1	0	1
American Indian or Alaska Native	1	0	1	1	0	1	3	0	2	4
Asian or Pacific Islander	0	0	0	0	0	0	0	0	0	0



OBESITY IN ARIZONA: PREVALENCE, HOSPITAL CARE UTILIZATION, MORTALITY

**TABLE 3**  
**MORBID OBESITY (ICD-9 CODE 278.0) AS THE UNDERLYING CAUSE OF DEATH ,**  
**ARIZONA RESIDENTS, 1990-1999 (CONTINUED)**

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
<b>County of residence:</b>										
Apache	0	0	0	0	0	0	0	0	1	2
Cochise	0	0	1	0	0	2	2	0	0	1
Coconino	0	0	0	0	0	1	1	0	0	0
Gila	1	0	0	0	1	0	0	0	0	0
Graham	1	0	0	0	0	1	0	0	0	0
Greenlee	0	0	0	0	0	1	0	0	0	0
Maricopa	6	8	14	12	15	12	14	12	16	16
Mohave	0	0	0	2	2	0	0	0	1	0
Navajo	1	0	0	0	3	1	1	0	0	0
Pima	3	1	1	0	5	5	4	1	4	5
Pinal	0	2	1	2	0	4	0	2	1	0
Santa Cruz	0	0	0	0	0	0	1	0	0	0
Yavapai	1	0	0	0	1	0	0	2	0	3
Yuma	1	0	1	2	0	2	0	0	1	1
La Paz	0	0	1	0	1	1	2	1	1	0
Unknown	0	0	0	0	0	0	0	0	1	2

# OBESITY IN ARIZONA: PREVALENCE, HOSPITAL CARE UTILIZATION, MORTALITY

**TABLE 4**  
**MORBID OBESITY (ICD-10 CODES E66.8 AND E66.9) AS THE UNDERLYING CAUSE OF DEATH AND ANY MENTION OF OBESITY ON DEATH CERTIFICATES, ARIZONA RESIDENTS, 2000-2005**

	2000	2001	2002	2003	2004	2005
Any mention of morbid obesity on death certificates	95	129	195	218	211	262
Obesity as the underlying cause of death:	<b>24</b>	<b>34</b>	<b>60</b>	<b>53</b>	<b>59</b>	<b>81</b>
<b>MORBID OBESITY (ICD-10 CODE E66.8)</b>	21	23	40	35	38	62
<b>OBESITY, UNSPECIFIED (ICD-10 CODE E66.9)</b>	5	11	20	18	21	19
<b>Gender:</b>						
Male	16	22	34	27	34	46
Female	8	12	26	26	25	35
<b>Age group:</b>						
Children 1-14 years old	0	0	1	0	0	0
Adolescents 15-19 years old	0	0	0	0	1	0
Young adults 20-44 years old	8	13	26	18	21	28
Middle-aged adults 45-64 years old	13	13	25	26	25	34
Elderly 65 years old or older	3	8	8	9	12	19
<b>Race/ethnicity:</b>						
White non-Hispanic	17	25	42	40	46	60
Hispanic or Latino	4	3	9	6	5	8
Black or African American	0	2	2	3	5	5
<b>American Indian or Alaska Native</b>	3	4	7	4	3	7
<b>Asian or Pacific Islander</b>	0	0	0	0	0	1

OBESITY IN ARIZONA: PREVALENCE, HOSPITAL CARE UTILIZATION, MORTALITY

**TABLE 4**  
**MORBID OBESITY (ICD-10 CODES E66.8 AND E66.9) AS THE UNDERLYING CAUSE OF DEATH AND ANY MENTION OF OBESITY ON DEATH CERTIFICATES,**  
**ARIZONA RESIDENTS, 2000-2005 (CONTINUED)**

	2000	2001	2002	2003	2004	2005
<b>County of residence:</b>						
Apache	0	0	2	1	0	0
Cochise	2	3	4	2	0	2
Coconino	1	0	0	0	1	3
Gila	0	0	2	1	1	0
Graham	0	0	1	0	1	0
Greenlee	0	0	0	0	0	0
Maricopa	12	23	29	34	39	46
Mohave	1	1	1	0	2	4
Navajo	0	0	1	0	0	2
Pima	7	4	13	4	10	9
Pinal	1	1	2	4	3	4
Santa Cruz	0	0	0	0	0	0
Yavapai	0	1	1	2	1	6
Yuma	0	1	4	4	0	5
La Paz	0	0	0	0	1	0
Unknown	0	0	0	1	0	0

OBESITY IN ARIZONA: PREVALENCE, HOSPITAL CARE UTILIZATION, MORTALITY

**TABLE 5**  
**CHARACTERISTICS OF SELECTED 40 DEATHS FROM MORBID OBESITY AMONG ARIZONA RESIDENTS IN 2005**

	Year of death	Gender	Age	ICD-10 code for the underlying cause of death	Condition A	Condition B	Condition C	Occupation
<b>1</b>	2005	F	66	E668	RESPIRATORY FAILURE	CHRONIC RESPIRATORY FAILURE	MORBID OBESITY	HOMEMAKER
<b>2</b>	2005	M	44	E668	COMPLICATIONS OF MORBID OBESITY	CONGESTIVE HEART FAILURE		CHEF
<b>3</b>	2005	M	40	E669	CHRONIC RESPIRATORY DISEASE	OBESITY		MANAGER
<b>4</b>	2005	F	67	E668	RESPIRATORY FAILURE	OBSTRUCTIVE SLEEP APNEA	MORBID OBESITY	SELF EMPLOYED
<b>5</b>	2005	M	47	E668	SLEEP APNEA	MORBID OBESITY, HYPERTENSION	ATRIAL FIBRILLATION, RENAL INSUFFICIENCY	TRUCK DRIVER
<b>6</b>	2005	M	42	E668	PULMONARY EMBOLI	DEEP VEIN THROMBOSIS	MORBID OBESITY	LABORER
<b>7</b>	2005	M	72	E669	CARDIAC ARREST	CONGESTIVE HEART FAILURE	OBESITY	MANAGER
<b>8</b>	2005	F	73	E669	RESPIRATORY ARREST DUE TO MASSIVE ISCHEMIC STROKE	HYPERTENSION	OBESITY AND DIABETES MELLITUS TYPE 2	RECORDS MANAGEMENT
<b>9</b>	2005	F	77	E669	CONGESTIVE HEART FAILURE	HYPERTENSION	OBESITY	HOUSEWIFE
<b>10</b>	2005	M	32	E668	RESPIRATORY FAILURE	MORBID OBESITY		PARKS/RECREATION LIAISON
<b>11</b>	2005	M	42	E668	ACUTE RESPIRATORY FAILURE	SEVERE SLEEP APNEA	MORBID OBESITY	LABORER
<b>12</b>	2005	M	46	E668	CARDIO-PULMONARY ARREST	MORBID OBESITY	CARDIOVASCULAR DISEASE AND PULMONARY HYPERTENSION	NURSING

OBESITY IN ARIZONA: PREVALENCE, HOSPITAL CARE UTILIZATION, MORTALITY

**TABLE 5**  
**CHARACTERISTICS OF SELECTED 40 DEATHS FROM MORBID OBESITY AMONG ARIZONA RESIDENTS IN 2005 (CONTINUED)**

	Year of death	Gender	Age	ICD-10 code for the underlying cause of death	Condition A	Condition B	Condition C	Occupation
<b>13</b>	2005	M	67	E668	ATRIAL FIBRILLATION	MORBID OBESITY	ACUTE ON CHRONIC RESPIRATORY FAILURE	GLASS GLAZER
<b>14</b>	2005	M	48	E668	CORONARY ARTERY DISEASE	MORBID OBESITY	UNCONTROLLED DIABETES	TATTOO ARTIST
<b>15</b>	2005	M	40	E668	CARDIAC FAILURE	MARKED CARDIOMEGALY	MORBID OBESITY	LABORER
<b>16</b>	2005	M	55	E668	CARDIORESPIRATORY	RESPIRATORY FAILURE	MORBID OBESITY	CARPENTER
<b>17</b>	2005	M	60	E668	MORBID OBESITY			PSYCHOLOGIST
<b>18</b>	2005	M	54	E669	MYOCARDIAL INFARCTION	HYPERTENSION	OBESITY	SALES PERSON
<b>19</b>	2005	F	44	E668	ACUTE RESPIRATORY FAILURE	OBSTRUCTIVE SLEEP APNEA	MORBID OBESITY	HOMEMAKER
<b>20</b>	2005	F	46	E668	CARDIOPULMONARY ARREST	CORONARY ARTERY DISEASE	MORBID OBESITY, HYPERTENSION, DIABETES	HOMEMAKER
<b>21</b>	2005	F	22	E668	COMPLICATIONS OF MORBID OBESITY			STUDENT
<b>22</b>	2005	M	57	E669	ACUTE MYOCARDIAL INFARCTION	HYPERTENSION	OBESITY	LIBRARIAN
<b>23</b>	2005	M	57	E668	OBSTRUCTIVE & RESTRICTIVE AIRWAY DISEASE	MORBID OBESITY		MECHANIC
<b>24</b>	2005	F	54	E668	CONGESTIVE HEART FAILURE	MORBID OBESITY		NURSING ASSISTANT
<b>25</b>	2005	M	54	E668	RESPIRATORY FAILURE	RESTRICTIVE LUNG DISEASE	MORBID OBESITY	MANUFACTURING SPECIALIST
<b>26</b>	2005	M	72	E668	CARDIAC ARREST	HYPERTENSION	COPD	SECURITY
<b>27</b>	2005	F	62	E668	COMPLICATIONS OF MORBID OBESITY			NURSING ASSISTANT
<b>28</b>	2005	F	82	E669	RENAL FAILURE	HYPERTENSION	OBESITY	OFFICE ADMINISTRATOR
<b>29</b>	2005	M	53	E669	CARDIAC ARREST	HYPERTENSION	OBESITY & HYPERLIPIDEMIA	MANAGER

OBESITY IN ARIZONA: PREVALENCE, HOSPITAL CARE UTILIZATION, MORTALITY

**TABLE 5**  
**CHARACTERISTICS OF SELECTED 40 DEATHS FROM MORBID OBESITY AMONG ARIZONA RESIDENTS IN 2005 (CONTINUED)**

	Year of death	Gender	Age	ICD-10 code for the underlying cause of death	Condition A	Condition B	Condition C	Occupation
<b>30</b>	2005	M	44	E668	HYPOXIA	OBSTRUCTIVE APNEA	MORBID OBESITY	FARMER/LABORER
<b>31</b>	2005	F	62	E668	PROBABLE ACUTE CORONARY ARREST	SEVERE COPD / OXYGEN DEPENDENT	MORBID OBESITY	MECHANIC
<b>32</b>	2005	F	40	E668	MYOCARDIAL INFARCTION	HYPERTENSION	MORBID OBESITY	HOMEMAKER
<b>33</b>	2005	F	34	E668	PULMONARY EMBOLUS	MORBID OBESITY		NEVER WORKED
<b>34</b>	2005	F	58	E668	SEPSIS SECONDARY TO NECROTIC BOWEL	MORBID OBESITY S/P GASTRIC BYPASS SURGERY		BUDGET ANALYST
<b>35</b>	2005	M	40	E668	PULMONARY EMBOLISM	MORBID OBESITY		COORDINATOR
<b>36</b>	2005	F	41	E668	CARDIAC ARREST	RESPIRATORY ARREST	MORBID OBESITY	HOMEMAKER
<b>37</b>	2005	F	40	E669	ACUTE MYOCARDIAL INFARCTION	HEART FAILURE	OBESITY	HOMEMAKER
<b>38</b>	2005	F	60	E668	RESPIRATORY FAILURE	MORBID OBESITY	SEPSIS, UNKNOWN ETIOLOGY	CLERK
<b>39</b>	2005	F	67	E668	COPD	MORBID OBESITY		TEACHERS AIDE
<b>40</b>	2005	F	64	E668	CARDIAC ARREST	CORONARY ARTERY DISEASE	MORBID OBESITY	BASKETMAKER

Note: There were 81 deaths due to morbid obesity as the underlying cause of death in 2005

ICD-10 code E668: morbid obesity  
ICD-10 code E669: obesity, unspecified

**References**

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